

Claims:

- 1 1. A component for a combustible laser comprising:
  - 2 a first and a second gain region;
  - 3 a combustion region; and
  - 4 a first and a second nozzle blade, wherein the first and the second nozzle blades separate
  - 5 the combustion region from the first and second gain regions; and
  - 6 further wherein each of the first and second nozzle blades is comprised of a primary
  - 7 structure and a secondary structure.
- 8 2. The component according to claim 1, wherein the primary structure is formed from a first
- 9 material and the secondary structure is formed of a second material.
- 10 3. The component according to claim 2, wherein the second material is able to withstand
- 11 higher temperatures than the first material.
- 12 4. The component according to claim 2, wherein the first material is aluminum.
- 13 5. The component according to claim 2, wherein the second material is selected from the
- 14 group consisting of nickel, stainless steel, lanthanum hexaboride and alumina.
- 15 6. The component according to claim 1, wherein the first and second nozzle blades are self-
- 16 cooling.
- 17 7. The component according to claim 1, wherein the first and second nozzle blades are
- 18 serrated.
- 19 8. The component according to claim 1, wherein the secondary structure is cooled by at
- 20 least one injected combustor reactant.

1    9.    The component according to claim 8, wherein the at least one injected combustor reactant  
2    is selected from the group consisting of nitrogen, trifluoride, deuterium and helium.

1    10.    A component for a combustion laser comprising:  
2                at least one inlet manifold for receiving and distributing combustion fuel;  
3                at least one upper manifold sheet having holes therein for receiving combustion  
4    fuel from the at least one inlet manifold and further distributing the combustion fuel;  
5                at least one pair of nozzle blade structures for receiving the combustion fuel from  
6    the at least one upper manifold sheet; and  
7                at least one lower manifold sheet, wherein the at least one inlet manifold, the at  
8    least one upper manifold sheet, the at least one pair of nozzle blade structures, and the at least  
9    one manifold sheet are stacked one on the other and affixed one to the other in a stacked  
10   relationship.

1    11.    The component according to claim 10, wherein each of the nozzle blade structures  
2    includes a primary nozzle having a serrated tip.  
3  
1    12.    The component according to claim 11, wherein the primary nozzle is enclosed in a cavity  
2    shroud so as to facilitate the injection of an isolation gas downstream of a laser cavity in order to  
3    isolate the laser cavity from downstream pressure disturbances.

1    13.    The component according to claim 10, wherein the isolation gas is helium.

1    14.    A laser comprising:  
2                at least two combustion modules, wherein the at least two combustion modules each  
3    include a combustion region and two gain regions such that the combustion region is separated  
4    on two sides from the two gain regions via two nozzles structures; and

5 further wherein the at least two combustion modules are adjacent to one another such that  
6 the combustion region, the two gain regions, and the two nozzle structures for each of the at least  
7 two combustion modules are aligned.

1 15. The laser according to claim 14, further comprising a manifold assembly for aligning and  
2 attaching the at least two combustion modules within the laser, wherein the manifold assembly  
3 comprises:

4 at least one inlet manifold for receiving and distributing combustion fuel;

5 at least one upper manifold sheet having holes therein for receiving combustion  
6 fuel from the at least one inlet manifold and further distributing the combustion fuel to the at  
7 least two combustion modules; and

8 at least one lower manifold sheet, wherein the at least one inlet manifold, the at  
9 least one upper manifold sheet, the at least two combustion modules, and the at least one  
10 manifold sheet are stacked one on the other and affixed one to the other in a stacked relationship.